INSECTS FROM LACTUCA STEMS*

By Ethel Louise Shaw

This is a study of the insect population found in the stalks of *Lactuca spicata* (Lam.) Hitche, of the family Compositæ. The plants used were collected from three small open woodlands near Ithaca, N. Y. The plants were growing on the banks of small streams or on slightly marshy ground on a hillside.

This plant is well adapted for supporting a large insect population within its stalks. From the base up to a height of two or three feet the stem is almost entirely hollow, but from this point on up to the apex the pith increases in thickness until, when the flower panicle is reached, the center of the stalk is almost completely filled. The most abundant insect population was found where the pith was from 1/4 to 3/16 inches thick.

The material used in this study consisted of the stalks of the previous season. These were brought indoors, some being examined immediately to determine what stages in the life history of the various insects were present at that time; others were kept in a warm room for the purpose of rearing adults.

NOTES ON INSECTS FOUND[1]

Hemiptera

This order was represented by a single adult *Brachymena quadripustulata,* family Pentatomidae, which was found dead within the hollow stalk of a plant collected on March 13.

* The work was done at Cornell University under the direction of Dr. James G. Needham during the late winter and spring of 1930.

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Lepidoptera

Dr. W. T. M. Forbes and Mr. A. B. Klots, Cornell University.

Diptera

Dr. O. A. Johannsen, Cornell University.

Hymenoptera

Dr. L. H. Weld and Dr. A. B. Gahan, U. S. Bureau of Entomology, Washington, D. C.

Dr. J. C. Bradley and Mr. V. S. L. Pate, Cornell University.

Coleoptera

One adult beetle was found free-ranging in the hollow *Lactuca* stem. It was a minute, shining black, convex insect belonging to the family Phalacridæ, whose members are said to live in flowers and under the bark of trees.

Lepidoptera

The commonest caterpillar found was *Phalonia bunteana* which is a borer in the stalks of a number of herbaceous plants. The larvæ found were in shallow depressions about $\frac{3}{8}$ of an inch long, hollowed out of the pith and roofed over with a covering of silk and frass. In one case three larvæ were found in one stem. All others were in separate stalks. Several larvæ were kept alive indoors for months without pupation. It is believed that the pupal stage of this species does not begin until midsummer. The *Phalonia* caterpillars were found usually about half way between the base of the plant stalk and its apex.

In a shallow depression similar to that of *Phalonia* was found a single larva of the genus *Pyrausta,* the group to which belongs the destructive European corn-borer, *Pyrausta nubilalis.* No life history of an insect of this genus has ever been described from *Lactuca.* As the single specimen found had to be killed for identification it was not possible to obtain an adult for determination of species.

On May 9 an examination of *Lactuca* stalks, all obtained in the same locality, yielded three larvæ of the family Noctuidæ. Only one larva was found in a stalk, and all were apparently actively boring in the pith, each being surrounded by an accumulation of frass. The genus could not be determined without rearing the adults, but it is believed to be closely associated with the cutworms, although the boring habit is not characteristic of this group.

Diptera

Well down near the base of several stalks of *Lactuca* were found adult insects of the family Mycetophilidae, genus *Exechia.* Usually only single specimens were found, but in one stalk a group of four were packed closely together. As the first adult

was found on March 13 it is probable that the insects were hibernating in that stage.

The only other representative of this order was a specimen of *Agromyza virens* Loew which was found in the pupal stage in material brought indoors on March 22, and which later emerged.

Hymenoptera

In material collected on May 9, a few inches from the apex of a dried stalk was found an adult female carpenter-bee, *Ceratina dupla* Say. Insects of this genus commonly build nests, provisioned with pollen and nectar, in the stems of sumac and other plants, so it was not unusual to find this female in such a situation.

A number of specimens of *Scambus scriptifrons* (Cresson) were found pupating in depressions in the pith of several stalks. Adults were obtained from two of these pupæ.

By far the most numerous members of the *Lactuca* population were insects belonging to the superfamilies Cynipoidea and Chalcidoidea. Because of the fact that this study was carried on during the part of the year when no fresh plant material was available, the life histories and relationships of the species found could not be carried through.

Of the Cynipoidea only one species was found—*Aulacidea podagrae* (Bassett). This species belongs to the tribe Aulacini which contains the most primitive members of the family Cynipidae. Three species of *Aulacidea* have been reported from *Lactuca* in this country. *A. podagrae* has been described from *Quercus* as well as from *Lactuca*. The normal time of emergence of this species is mid-June. From *Lactuca* stalks brought indoors on February 20 adults first emerged on March 18. The cynipids were found to be much slower in pupating than the chalcids.

The galls caused by *A. podagrae* take the form of rounded swellings at the leaf nodes of the host plant, or they occur as small hollow chambers scattered throughout the pith with no external evidence of their existence.

Kinsey says of this species: "It may be that the state of the plant at the time the insect's egg is laid in it, or the physiological

nature of the particular plant, due to its special environment, determines the extent of the hypertrophy. In either event it seems that the gall-producing powers of the insect are not developed enough to insure the formation of a gall except under the most favorable circumstances, although other Cynipidæ, whenever they produce a gall at all, apparently always produce galls of a uniform pattern and of the same degree of complexity."

The galls were found to be fairly definite in distribution in the various stems examined. In no plants were galls found to be present in the roots or in the basal foot of stem. In the second and third feet only occasional galls were present, while from the fourth foot upward to the beginning of the flower panicle they were extremely abundant. A count of the larvæ found in one inch of stem which appeared to have a maximum infestation yielded a total of 68. Others more moderately infested were found to have 20 larvæ per inch. This count included both cynipids and chalcids. On May 5 an examination was made of three 6-inch sections of stem, all much swollen by galls. These sections of stem had been brought indoors in October, and had been kept in a closed glass jar throughout the winter. A count of the population which had emerged from these galls gave 245 adults of *Aulacidea podagrae,* and 14 adults of *Ormyrus ventricosus.* A few pupæ were also found.

These figures give only a general idea of the stupendous numbers of these insects which must emerge from one small patch of *Lactuca* during a single season. It is indeed fortunate that these two groups act as checks upon each other. If the cynipids begin to increase greatly, the parasitic chalcids increase also, and feed upon them; if the chalcids become too numerous the food supply becomes insufficient and their numbers decrease. So is the balance of nature accomplished.

In the group Chalcidoidea three distinct species were found. Very few parasites emerged from the enlarged stem galls, most of them coming from the small chambers in the pith of normal-sized stalks. Whether some of these species are true gall-makers themselves is uncertain. From some stalks nearly the whole emerging population consisted of chalcids.

The first chalcid to emerge, and the species which proved most numerous in all the material examined, was *Ormyrus ventricosus*

Ashmead, a brilliant metallic green insect about 4 mm. in length. On March 8 a large number of these newly emerged chalcids was examined from material brought in February 15, and all were found to be males. Two days later another emerging group was made up wholly of females of the same species. This order of emergence is said to be characteristic of most chalcids.

The second group to emerge was made up of individuals of the species *Eurytoma tylodermatis* Ashmead, the first specimens being noted on March 13 from stalks brought in February 20. These eurytomids were easily distinguished from the previous group by their lack of metallic coloring and by their shining black abdomens. In the male the abdomen is small and distinctly pediceled, and each antennal segment is constricted at its apex and provided with a conspicuous whorl of long hairs. The female has a less distinct pedicel, a larger abdomen, and lacks the antennal constrictions and whorls of hairs.

Of the third species, *Eupelminus coleopterophagus* Girault, only one specimen was found. This was an apterous form about 4 mm. in length.

This very brief survey of the insect population of *Lactuca* stems has thus revealed representatives of five different orders, totaling thirteen species, of which at least five are permanent residents in the stalks of the host plant.

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TWO NEW LOCALITIES FOR PARNASSIUS APOLLO IN ASIA MINOR

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This year the well-known entomologist and cavern-searcher, Mr. L. Weirather-Innsbruck (Austria, Postfach 109) on his expedition to the Pisidian Taurus has discovered two new localities for *Parnassius apollo* in Asia Minor.

One of the localities is situated in the sterile country of Anamas (northwest of the lake of Bey-Shéhir and south of the Sultan Dagh next Ak-Shéhir). The other locality is in the north of the high mountains in the Ovagyk-group (northeast of Adalia). The scientific determination of this race which is close to *anatolicus* Pgst., has not been settled exactly. It will be necessary to compare all the known localities on a map showing the zoogeographical distribution of *P. apollo* in Asia-Anterior. That such did not exist until now is regretted by the collector.

Note: According to a recent communication from Mr. Holtz, the new race will be described by Mr. Eisner in "Parnassiana." —Ed.